

Calculators may NOT be used.

Name _____

1. 3 Ten contestants numbered 1-10 stand in order around a circle. Beginning the count at 1, every 5th contestant will be eliminated until only one remains. What is the number of the last remaining contestant?

Drawing a circle, placing the integers 1-10 around it in order, and then going through the process of crossing out every 5th number is probably the easiest way to solve the problem. The numbers would be crossed off in the following order: 5, 10, 6, 2, 9, 8, 1, 4, 7. The final remaining number is **3**.

2. -20 A magic square is an array of numbers in which the sum of the numbers in each row, column and diagonal has the same value. In the given magic square, what is the product of the values of m , a , t and h ?

1	-6	m
-4	a	0
-3	t	h

From the first column, we can see that our common sum is $1 + -4 + -3 = -6$. Solving for m using the first row, we see that $m = -6 - (1 + -6) = -6 - (-5) = -1$. Solving for a using the second row, we see that $a = -6 - (-4 + 0) = -6 - (-4) = -2$. Using $a = -2$, and solving for t using the second column, we see that $t = -6 - (-6 + -2) = -6 - (-8) = 2$. Using $m = -1$ and solving for h in the third column, we see that $h = -6 - (-1 + 0) = -6 - (-1) = -5$. Therefore the product of m , a , t and h is $(-1)(-2)(2)(-5) = -20$.

3. $4\frac{17}{20}$ min



A printer can print 10 pages of text per minute or 4 pages of graphics per minute. How many minutes will it take to print 31 pages of text and 7 pages of graphics? Express your answer as a mixed number.

A printer that prints 10 pages of text per minute can print 1 page of text in $\frac{1}{10}$ of a minute. A printer that prints 4 pages of graphics per minute can print 1 page of graphics in $\frac{1}{4}$ of a minute. Therefore, it will take $(31)(\frac{1}{10}) + (7)(\frac{1}{4})$ minutes to complete the job. This is $(31)(\frac{1}{10}) + (7)(\frac{1}{4}) = \frac{31}{10} + \frac{7}{4} = \frac{62}{20} + \frac{35}{20} = \frac{97}{20} = 4\frac{17}{20}$.

4. 8 inches A rectangular box has a volume of 480 cubic inches. The height of the box is 5 inches. The ratio of the length of the box to the width of the box is 3 to 2. What is the measure of the width of the box?

If the ratio of the length of the box to the width of the box is 3 to 2, then we can represent the length and width as $3x$ and $2x$, respectively. The formula for the volume of a rectangular prism (box) is $V = l \times w \times h$, which is $(3x)(2x)(5)$ for our box. Therefore, $480 = (3x)(2x)(5) \rightarrow 480 = 30x^2 \rightarrow 16 = x^2 \rightarrow x = \pm 4$. Since the length and width are positive values, $x = 4$. The width of the box is then $2x = 2(4) = 8$ inches.

5. 13 combos How many different combinations of nickels, dimes and/or quarters equal exactly 60 cents? One such combination to include is shown here.



Let's start with using the most quarters possible, which would be 2 quarters. If we use 2 quarters, we could get to 60 cents using either 1 or 0 dimes (and 0 or 2 nickels, respectively). That makes a total of 2 ways with 2 quarters. If we only use 1 quarter, we can get to 60 cents using 3, 2, 1 or 0 dimes, for a total of 4 ways. Notice that our number of nickels is just dependent on the number of dimes; there is one option for the nickels for each option for the dimes. If we use 0 quarters, we can get to 60 cents using anywhere from 6 to 0 dimes, inclusive. That's 7 ways. Therefore, there are $2 + 4 + 7 = 13$ combinations of nickels, dimes and/or quarters that result in exactly 60 cents.